



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,597	02/25/2005	Nevio Benvenuto	IT02 0025 US	3611
65913	7550	04/14/2010	EXAMINER	
NXP, B.V. NXP INTELLECTUAL PROPERTY & LICENSING M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131			NEFF, MICHAEL R	
			ART UNIT	PAPER NUMBER
			2611	
			NOTIFICATION DATE	DELIVERY MODE
			04/14/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary

Application No.

10/525,597

Applicant(s)

BENVENUTO ET AL.

Examiner

MICHAEL R. NEFF

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 February 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 17-28 and 33-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 17-28 and 33 is/are rejected.
- 7) ☒ Claim(s) 34-36 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Request for Continued Examination

1. The request filed on 2/23/2010, for a Request for Continued Examination (RCE) under 37 CFR 1.114 based on the Parent Application No. 10525597 is acceptable and a RCE has been established. An action on the RCE follows.

Response to Arguments

2. Applicant's arguments filed 2/23/2010 have been fully considered but they are not persuasive. The examiner thoroughly reviewed the applicant's arguments but firmly believes that the cited reference reasonably and properly meets the claimed limitation as rejected.

Applicant's arguments: "Applicant traverses each of the rejections for lack of correspondence. As noted in the previous Response, none of the asserted references teaches the claimed invention "as a whole" (§ 103(a)) including aspects regarding, e.g., an adding circuitry for adding the output signal of said feedback filter circuitry to the output signal of said first section, a feedback filter circuitry for performing a linear filtering of a signal derived from an output signal of said second section, and/or a detector circuitry for extracting samples from the output signal of said adding circuitry. Applicant maintains that the '418 reference does not interact to function as a separate section as claimed."

Examiner's response: Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the

references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

The above argument is a reiteration of previous assertions that have been responded to without providing specifics towards new argument grounds.

Applicant's arguments: "For instance, the teachings of the '418 and '058 references (as applied to each of the rejections) have not been shown to work together and the skilled artisan would be lead away from the combination of disparate teachings."

Examiner's response: The argument that the provided references teach away from one another has been previously presented and previously rebutted by the Examiner. The motivation for said combination has also been previously presented. The current arguments appear to present a different argument towards the combination without taking into consideration the provided motivation. Therefore as the claim scope and the grounds of rejection have not changed, and the provided motivation for the combination has not changed and the grounds of rejection are maintained.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1-10, 12, 18-27 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birru (US Publication 2002/0037058 A1) in view of Raghavan (US Patent 6,115,418).

Re claims 33, 1 and 18, Birru discloses a frequency-domain decision feedback equalizer device and associated method for single carrier modulation, the device comprising:

a first section including a fast Fourier transformer (Figure 12, element 1103) to perform a fast Fourier transformation on a first vector of single carrier signals inputted into said first section (Paragraph 0005-0007, 0024 which while directed at figure 2 explains the FFT system function in greater detail), and to output the transformed signals as a second vector of signals (output of 1103; paragraph 0024),

a feed forward equalizer (1104) to perform a feed forward equalization by generating equalization parameters using a fast Fourier transformation (1207) estimation of a channel impulse response (output of 1206; paragraphs 0007) of an output single carrier signal (Paragraph 0005) of said first section, multiplying each of the components of said second vector of signals with the generated equalization parameters (Figure 12, elements 1105 and output from 1104) to reduce the signal-noise ratio of the signals (Paragraphs 0054-0055; Figure 6), and outputting the multiplied signals as a third vector of signals (output of 1105; Paragraph 0025), and

an inverse fast Fourier transformer to perform an inverse fast Fourier transformation on said third vector of signals (Figure 12, element 1106), and to output the inversely transformed signals as a fourth vector of signals that is the output signal of

the first section (output of 1106; paragraphs 0038, 0005-0007) however Birru fails to explicitly disclose a second section including a feedback filter to linearly filter a signal derived from an output signal of said second section, an adder to add the output signal of said feedback filter to the output signal of said first section, and a detector to receive the output signal of said adder and generate said output signal of said second section by extracting samples from the output signal of said adder.

These designs are however disclosed by Raghavan. Raghavan discloses a decision feedback equalizer comprising a feedback filter (Figure 7, element 429) to linearly filter a signal derived from an output signal of said second section (Figure 7, element 408), an adder (Figure 7, element 421) to add the output signal of said feedback filter (output of 429 which is input to 421) to the output signal of said first section (input signal y_k to element 421), and a detector (Figure 7, element 404) to receive the output signal of said adder and generate said output signal of said second section by extracting samples from the output signal of said adder (output of 404; Col. 10 line 13-Col. 11 line 3 provide detailed disclosure of the DFE design).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the frequency-domain equalizer design as disclosed by Birru to incorporate the decision feedback equalizer design as disclosed by Raghavan in order to incorporate the recursive and well known design into the aspect of the sample discarding/selection after the forward equalization takes place in first section of the design allowing for the added benefit of utilizing feedback decision elements to dynamically reduce the ISI effects within the system as explained by Raghavan.

Re Claims 2 and 19, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18, Birru further discloses wherein said feed forward equalization means is provided for generating equalization parameters adapted for minimizing the signal-to-noise ratio of the signal processed in the frequency-domain decision feedback equalizer device, preferably in the output signal of said first section (Figure 12, elements 1105 and output from 1104; Paragraphs 0054-0055; Figure 6).

Re Claims 3 and 20, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18, Birru further discloses wherein said feed forward equalization means is provided for generating equalization parameters by taking into account a fast Fourier transformation (1207) estimation of a channel impulse response (output of 1206) of the signal processed in the frequency-domain decision feedback equalizer device, preferably in the output signal of said first section (Figure 12, elements 1104, 1207, output of 1206; paragraphs 0007).

Re Claims 4 and 21, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18, Birru further discloses wherein said first section further comprises: a serial to parallel converting means for converting a sequence of signals inputted into said first section to said first vector of signals (1102),

and a parallel to serial converting means for converting said fourth vector of signals to a sequence of output signals of said first section (1107).

Re Claims 5 and 22, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 4 and 21, Birru further discloses wherein said serial to parallel converting means is adapted to receive scalar signals (Paragraph 0005 symbol stream input to S/P).

Re Claims 6 and 23, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 4 and 21, Birru further discloses wherein said signal to parallel converting means is provided to generate said first vector of signals including blocks of a predetermined number of consecutive samples of the signals inputted into said first section (Paragraph 0005-0006; M, N size elements).

Re Claims 7 and 24, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 4 and 21, Birru further discloses wherein said parallel to serial converting means and said feedback filter means are provided to output scalar signals (Paragraph 0005-0007).

Re Claims 8 and 25, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 6 and 23, Birru further discloses wherein said parallel to serial converting means is provided to output a scalar signal which is

constituted by consecutive blocks of a predetermined number of samples, each block being built with the predetermined number of samples of each block of said fourth vector of signals (Paragraphs 0005-0007 M and N elements).

Re Claims 9 and 26, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18, Raghavan further discloses wherein said detector means is adapted to receive and output discrete time signals (Col. 3 lines 23-24; equations 2 and 3 shows sample time is relevant in detection means).

Re Claims 10 and 27, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18, Raghavan further discloses wherein said detector means is provided to generate said output signal (404, output from 404).

Re Claim 12, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claim 1, Birru further discloses wherein a receiver of a communication system using a single carrier modulation (paragraph 0005), wherein said receiver includes said first and second sections of the frequency-domain decision feedback equalizer device (combination of cited disclosure as applied above wherein Birru represents the 'first section' and Raghavan represents the 'second section').

5. Claims 11 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birru and Raghavan as applied to claim 1 and 18 above, and further in view of Johnson et al. (herein after Johnson) (US Patent 5,808,574).

Re Claims 11 and 28, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18; Raghavan further discloses wherein said second section further comprises a feedback input generator means for receiving said output signal of said second section and providing an output signal which is built by consecutive blocks, each block comprising a predetermined number (M) of samples from said output signal of said section, to said feedback filter means (Col. 10 lines 25-62); however the combination of Birru and Raghavan fails to explicitly disclose wherein each block is also including a pseudo noise sequence.

This design is however disclosed by Johnson. Johnson discloses a feedback system within a communication system wherein the signals within the feedback loop are adjusted to include a pseudo noise sequence (Col. 45 lines 29-43).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the feedback equalizer disclosure of Birru and Raghavan to insert pseudo noise into the feedback signal as disclosed by Johnson in order to gain the benefit of improving on system performance and symbol detection.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Birru and Raghavan as applied in claim 1, and further in view of Thomas et al. (herein after Thomas) (US Publication 2004/0013084 A1).

Re Claim 17, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claim 1; Birru further discloses a communication system including a transmitter using a single carrier modulation (Paragraphs 0005, 0022-0023), for transmitting data, comprising a modulating means for organizing the data in blocks wherein each block is separated by a sequence of a predetermined signal (Paragraphs 0005, 0022-0023; inherent aspects of the transmit/receive capacity of the disclosed system) and a receiver of a communication system using a single carrier modulation (Paragraph 0005), wherein said receiver includes said first and second sections of the frequency-domain decision feedback equalizer device (combination of cited disclosure as applied above wherein Birru represents the 'first section' and Raghavan represents the 'second section'), however the combination fails to explicitly disclose wherein each block is separated by a sequence of a predetermined signal.

However these limitations are explicitly disclosed by Thomas. Thomas discloses separating each data block by a sequence of a predetermined signal, or a signal header, is explicitly disclosed by Thomas (Fig. 1-5).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate separating the data symbol blocks by a predetermined header symbol as disclosed by Thomas with the feedback equalizer as disclosed by Berberidis in order to gain the benefit of improved symbol recognition and demodulating within the receiver end of the communication system.

Allowable Subject Matter

7. Claims 34-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
8. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to anticipate or render obvious the specifics of the pseudo noise sequence composition.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL R. NEFF whose telephone number is (571)270-1848. The examiner can normally be reached on Monday - Friday 8:00am - 4:30pm EST ALT Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571)272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MICHAEL R. NEFF/
Examiner, Art Unit 2611
/Shuwang Liu/
Supervisory Patent Examiner, Art Unit 2611